

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD  
ACUTE LC<sub>50</sub> TEST WITH AN ESTUARINE/MARINE SHRIMP  
§ 72-3 (C)

1. CHEMICAL: Mepiquat Chloride PC Code No.: 109101

2. TEST MATERIAL: Mepiquat Chloride Purity: 54.6 %

3. CITATION

Authors: Drottar, Kurt R., James P. Swigler,  
and Catherine M. Holmes.  
Title: Mepiquat chloride: A 96-hour static acute  
toxicity test with the Saltwater Mysid  
(*Mysidopsis bahia*).

Study Completion Date: January 17, 1995

Laboratory: Wildlife International Ltd.

Sponsor: BASF Corporation

Laboratory Report ID: 147A-122

MRID No.: 435167-03

DP Barcode: D212401

4. REVIEWED BY: William S. Rabert, Biologist, EEB, EFED

Signature: *William S. Rabert* Date: *Oct. 4, 1995*

5. APPROVED BY: Harry Craven, Head of Section 4, EEB, EFED

Signature: *Harry Craven* Date: *10/12/95*

6. STUDY PARAMETERS

Scientific Name of Test Organism: *Mysidopsis bahia*  
Age or Size of Test Organism: Juveniles (< 24 hours old)  
Definitive Test Duration: 96 hours  
Study Method: Static  
Type of Concentrations: Mean measured

7. CONCLUSIONS: The 96-hour LC<sub>50</sub> value for saltwater mysid  
exposed to Mepiquat Chloride was > 136 mg  
a.i./L (ppm). The NOEC was 79 mg a.i./L.

Results Synopsis: 10 Percent mortality at 136 ppm a.i..

LC<sub>50</sub>: > 136 ppm ai 95% C.I.: N/A  
NOEL: 79 ppm ai Probit Slope: N/A

8. ADEQUACY OF THE STUDY

A. Classification: Core for 54.6 % formulation.

B. Rationale: N/A

C. Repairability: N/A

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9. BACKGROUND

10. GUIDELINE DEVIATIONS

1. Salinity of the test water was 20 ‰, rather than 10 to 17 ‰, specified in SEP for euryhaline shrimp species.

11. SUBMISSION PURPOSE:

12. MATERIALS AND METHODS

A. Test Organisms

Guideline Criteria	Reported Information
<u>Species</u> Preferred species are <i>Mysidopsis bahia</i> , <i>Penaeus setiferus</i> , <i>P. duorarum</i> , <i>P. aztecus</i> and <i>Palaemonetes</i> sp.	<i>Mysidopsis bahia</i>
<u>Age</u> Juvenile, mysids should be ≤ 24 hours old	< 24 hours old
<u>Supplier</u>	Wildlife lab cultures
All shrimp are from same source?	Yes
All shrimp are from the same year class?	Yes

B. Source/Acclimation

Guideline Criteria	Reported Information
<u>Acclimation Period</u> minimum 10 days	14 days
Wild caught organisms were quarantined for 7 days?	N/A
Were there signs of disease or injury?	No
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	N/A

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Guideline Criteria	Reported Information
<p><b>Feeding</b> No feeding during the study and no feeding for 24 hour before the beginning of the test if organisms are over 0.5 g each.</p>	Fed twice daily during the test
<p><b>Pretest Mortality</b> &lt;3% mortality 48 hours prior to testing</p>	Unreported, transferred directly from cultures to test chambers

C. Test System

Guideline Criteria	Reported Information
<p><b>Source of dilution water</b> Soft reconstituted water or water from a natural source, not dechlorinated tap water</p>	Natural seawater collected at Indian River Inlet, Delaware and diluted to a salinity of 20 ‰ with well water
<p>Does water support test animals without observable signs of stress?</p>	Yes
<p><b>Salinity</b> 30-34 ‰ for marine (stenohaline) shrimp and 10-17 ‰ for estuarine (euryhaline) shrimp, weekly range &lt; 6 ‰</p>	20 ‰
<p><b>Water Temperature</b> Approx. 22 ± 1 °C</p>	24.1 to 24.8 °C
<p><b>pH</b> 8.0-8.3 for marine (stenohaline) shrimp, 7.7-8.0 for estuarine (euryhaline) shrimp, monthly range &lt; 0.8</p>	7.9 to 8.2
<p><b>Dissolved Oxygen</b> Static: ≥ 60% during 1<sup>st</sup> 48 hrs and ≥ 40% during 2<sup>nd</sup> 48 hrs, Flow-through: ≥ 60%</p>	6.0 to 8.5 mg/L
<p><b>Total Organic Carbon</b></p>	1.4 mg/L

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Guideline Criteria	Reported Information	
<p><b>Test Aquaria</b></p> <p>1. <u>Material</u>: Glass or stainless steel</p> <p>2. <u>Size</u>: 19.6 L is acceptable for organisms <math>\geq 0.5</math> g (e.g. pink shrimp, white shrimp, and brown shrimp), 3.9 L is acceptable for smaller organisms (e.g. mysids and grass shrimp).</p> <p>3. <u>Fill volume</u>: 15 L is acceptable for organisms <math>\geq 0.5</math> g, 2-3 L is acceptable for smaller organisms.</p>	<p>glass beakers</p> <p>2 L</p> <p>1.5 L</p>	
<p><b>Type of Dilution System</b> Must provide reproducible supply of toxicant</p>	<p>None</p>	
<p><b>Flow Rate</b> Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period</p>	<p>N/A</p>	
<p><b>Biomass Loading Rate</b> Static: <math>\leq 0.8</math> g/L at <math>\leq 17^\circ\text{C}</math>, <math>\leq 0.5</math> g/L at <math>&gt; 17^\circ\text{C}</math>; flow-through: <math>\leq 1</math> g/L/day</p>	<p>Not reported, but 10 mysids in 1.5 L is acceptable</p>	
<p><b>Photoperiod</b> 16 hours light, 8 hours dark</p>	<p>16 h light, 8 h dark.</p>	
<p><b>Solvents</b> Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests</p>	<p>Solvent: N/A Maximum conc.: ml/L.</p>	

**D. Test Design**

Guideline Criteria	Reported Information	
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<p><b>Range Finding Test</b> If <math>LC_{50} &gt; 100</math> mg/L with 30 shrimp, then no definitive test is required.</p>	<p>&gt; 120 mg a.i./L no mortality</p>
<p><b>Nominal Concentrations of Definitive Test</b> Control &amp; 5 treatment levels; a geometric series in which each concentration is at least 60% of the next higher one.</p>	<p>16, 26, 43, 72, &amp; 120 mg ai/L</p>
<p><b>Number of Test Organisms</b> Minimum 20/level, may be divided among containers</p>	<p>20</p>
<p>Test organisms randomly or impartially assigned to test vessels?</p>	<p>Yes</p>
<p>Biological observations made every 24 hours?</p>	<p>Yes</p>
<p><b>Water Parameter Measurements</b> 1. <u>Temperature</u> Measured constantly or, if water baths are used, every 6 hrs, may not vary &gt; 1°C 2. <u>DO and pH</u> Measured at beginning of test and ever 48 h in the high, medium, and low doses and in the control</p>	<p>24.1 - 24.8 °C  D.O. 6.0 - 8.5 mg/L 6.0 at 48 hours 6.0 / 6.71 = 89 % saturation  pH 7.9 - 8.2</p>
<p><b>Chemical Analysis</b> needed if solutions were aerated, if chemical was volatile, insoluble, or known to absorb, if precipitate formed, if containers were not steel or glass, or if flow-through system was used</p>	<p>measured conc. with ion chromatographic system,  not aerated  no precipitate</p>

13. **REPORTED RESULTS**

A. **General Results**

Guideline Criteria	Reported Information
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Quality assurance and GLP compliance statements were included in the report?	Yes
Recovery of Chemical	102 - 133 %
Control Mortality Not more than 10% of control organisms may die or show abnormal behavior.	0 %
Raw data included?	Yes
Signs of toxicity (if any) were described?	Yes

**Mortality**

Concentration (ppm)		Number of Shrimp	Cumulative Number Dead			
Nominal	Mean Measured		Hour of Study			
			24	48	72	96
Control	--	20	0	0	0	0
Solvent Control	N/A					
16	19	20	0	0	0	0
26	29	20	0	0	0	0
43	49	20	0	0	0	0
72	79	20	0	0	0	0
120	136	20	0	0	0	2

Other Significant Results: None reported

**B. Statistical Results**

Method: estimated by visual inspection of mortality data

96-hr LC<sub>50</sub>: > 136 ppm ai      95% C.I.: N/A

Probit Slope: N/A      NOEC: 72 ppm ai

**14. VERIFICATION OF STATISTICAL RESULTS**

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Parameter	Result
Binomial Test $LC_{50}$ (C.I.)	N/A
Moving Average Angle $LC_{50}$ (95% C.I.)	N/A
Probit $LC_{50}$ (95% C.I.)	N/A
Probit Slope	N/A
NOEC	72 ppm ai

15. REVIEWER'S COMMENTS: Mepiquat is practically non-toxic to estuarine shrimp.